

SEP 26 2006

AMENDMENT TO THE CLAIMS:

This listing of claims will replace all prior versions of claims in the application:

LISTING OF CLAIMS:

- 1 1. (Canceled) A a magnetic head, comprising:
 - 2 a magnetoresistive sensor including a ferromagnetic free layer having first and
 - 3 second laterally opposed ends, and
 - 4 an electromagnet having first and second pole ends adjacent said first and second
 - 5 laterally opposed ends of said free layer for biasing a magnetization of said
 - 6 ferromagnetic free layer in a predetermined direction.
- 1 2. (Canceled) A magnetic head as in claim 1, wherein said electromagnet further
 - 2 includes:
 - 3 a magnetic yoke; and
 - 4 an electrically conductive coil formed about a portion of said yoke.
- 1 3. (Canceled) A magnetic head as in claim 2 wherein said yoke is formed with a gap to
 - 2 prevent electrical current from flowing through said yoke from said first pole end to said
 - 3 second pole end.
- 1 4. (Canceled) A magnetic head as in claim 2 further comprising first and second leads
 - 2 formed over said yoke.

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2

1 5. (Canceled) A magnetoresistive sensor as in claim 3, wherein said yoke includes first
2 and second portions separated by said gap and further comprising first and second
3 electrically conductive leads formed over said first and second portions respectively of
4 said yoke.

1 6. (Canceled) A magnetic head, comprising:
2 a magnetoresistive sensor having first and second laterally opposed sides;
3 a first magnetic layer having an end abutting said first side of said
4 magnetoresistive sensor, and extending from said sensor;
5 a second magnetic layer having an end abutting said second side of said
6 magnetoresistive sensor, and extending from said sensor; and
7 an electrically conductive coil formed about a portion of at least one of said first
8 and second magnetic layers.

1 7. (Canceled) A magnetic head as in claim 6, comprising:
2 first and second electrically conductive leads formed over said first and second
3 magnetic layers respectively.

1 8. (Canceled) A magnetic head as in claim 6, wherein said coil comprises:
2 a first set of parallel electrically conductive lines formed at a first elevation;
3 a second set of parallel electrically conductive lines formed at a second elevation;
4 and

5 a set of electrically conductive vias electrically connecting at least a portion of
6 said first electrically conductive lines with said second set of electrically conductive
7 lines.

1 9. (Original) A magnetic head comprising:

2 a magnetoresistive sensor having first and second laterally opposed sides;
3 a first front magnetic bias layer having a proximal end abutting said first side of
4 said sensor and having a distal end;
5 a second front magnetic bias layer having a proximal end abutting said second
6 side of said sensor and having a distal end;
7 a back magnetic bias layer having first and second ends;
8 an electrically conductive coil formed about a portion of said back magnetic bias
9 layer;
10 a portion of said first front bias layer overlapping a portion of said back bias
11 layer;
12 a portion of said second bias layer overlapping a portion of said back bias layer;
13 and
14 said first and second front bias layers being electrically isolated from said back
15 bias layer.

1 10. (Original) A magnetic head as in claim 9 wherein:

2 said distal end of said first front bias layer overlaps said first end of said back bias
3 layer; and

4 said distal end of said second bias layer overlaps said second end of said back bias
5 layer.

1 11. (Original) A magnetic head as in claim 10 further comprising;
2 a dielectric layer disposed between said first bias layer and said first end of said
3 back bias layer; and
4 a dielectric layer disposed between said second bias layer and said second end of
5 said back bias layer.

1 12. (Currently Amended) A magnetic head as in claim ~~40~~ 11 wherein said dielectric
2 layer formed between said first front bias layer and said first end of said back bias layer,
3 and said dielectric layer formed between said second front bias layer and said second end
4 of said back bias layer are each part of a contiguous bias layer.

1 13. (Original) A magnetic head as in claim 9 wherein said first and second front bias
2 layers and said back bias layer are formed of a soft magnetic material.

1 14. (Original) A magnetic head as in claim 9 wherein said first and second front bias
2 layers and said back bias layer are formed of NiFe.

1 15. (Canceled) A magnetic head as in claim 2, wherein said yoke comprises soft
2 magnetic material;

1 16. (Canceled) A magnetic head as in claim 2, wherein said yoke comprises a material
2 selected from the group consisting of NiFe, FeXN (where X is Al, Ta or Co), CoFe,
3 Sendust, CZT or CZN.

1 17 (Canceled) A magnetic head as in claim 6, wherein said first and second magnetic
2 layers comprise a soft magnetic material.

1 18. (Canceled) A magnetic head as in claim 6, wherein said first and second magnetic
2 layer comprise NiFe

1 19. (Canceled) A magnetic data storage system, comprising:
2 a magnetic disk
3 a motor connected with said disk for rotating said disk;
4 a slider;
5 an actuator connected with said slider for moving said slider relative to said disk;
6 a magnetic head connected with said slider, comprising:
7 a magnetoresistive sensor having first and second laterally opposed sides;
8 a first magnetic layer having an end abutting said first side of said
9 magnetoresistive sensor, and extending from said sensor;
10 a second magnetic layer having an end abutting said second side of said
11 magnetoresistive sensor, and extending from said sensor; and
12 an electrically conductive coil formed about a portion of at least one of
13 said first and second magnetic layers.

- 1 20. (Canceled) A magnetic data recording system comprising:
- 2 a magnetic tape;
- 3 a motor for moving said magnetic tape;
- 4 a magnetic head mounted adjacent said magnetic tape; said magnetic head
- 5 comprising:
- 6 a magnetoresistive sensor having first and second laterally opposed sides;
- 7 a first magnetic layer having an end abutting said first side of said
- 8 magnetoresistive sensor, and extending from said sensor;
- 9 a second magnetic layer having an end abutting said second side of said
- 10 magnetoresistive sensor, and extending from said sensor; and
- 11 an electrically conductive coil formed about a portion of at least one of
- 12 said first and second magnetic layer.